PERMALIGHT®
The intensive luminance

Guidebook for optical safety guidance systems
Quick orientation with guidance systems

When planning your evacuation and escape routes, the principle of enabling building occupants that are at risk to evacuate on their own is of primary importance.

It has to be ensured that during an emergency, building occupants can evacuate to safe areas quickly and without outside help. The most important requirement to accomplish this is to provide reliable guidance along the entire escape route.

For fire-risk areas the guideline for workplaces (ASR) therefore ask for a Low Location Lighting System.

In practice appropriate designs, made of lightstoring material stand the test of particularly effective, reliable and energy-saving.

While traditional markings have typically only consisted of individual spot markers like a sign or an emergency light, a low location safety guidance system continuously indicates the escape direction and additionally highlights obstacles along the way. When electrical emergency lighting already has failed and individual signs are no longer visible because of dense smoke accumulation, the continuous low location system still provides helpful orientation.

And of course, Permalight® products fulfill all requirements for standard compliant, safety-related escape route markings. according to the new guideline for workplaces (ASR)!

Permalight® – custom-designed safety way guidance systems from only one source!
Are you planning a new construction project, a building extension or renovation?
Do you have to prepare a risk analysis?
Do you want to make sure that your emergency and escape routes are equipped according to codes and standards?
Do you require a quick and smooth acceptance of work performed?
You plan the expansion of the existing low location guidance system according to ASR?

Permalight® is the right answer!

With pleasure we will inform you:

Call: +49-5101/92 63-0
Our full-service package is available to you

**Documentation of actual safety situation**

- **without on-site inspection**: you know your demand and have the adequate safety plans for your building available? We determine the necessary safety guidance products for you.
- **with on-site inspection**: you don’t know your demand of fire protection signs, escape route signs and products for Low Location Guidance Systems? We develop the necessary marking arrangements on site. Of course the individual danger zones of your building will be taken into consideration.
- We arrange a test measuring of the illumination in your building.

**Planning and quoting**

Optionally we prepare for you
- a plan of demand for your building/complex of buildings
- a partial plan for single areas of the buildings for example stairways, production areas, warehouses etc.
- Of course we take attention to the standard conformance, effectiveness and profitability!

**Delivery and installation**

- delivery of catalogue products within 24 hours
- development and production of products with individual luminance for special areas in 5-6 weeks
- project performance and support from start to finish
- on demand the installation can be made by yourself
- if required an installation of samples can be made
- measuring on location according to DIN 67510, part 2

**Documentation**

- creating of concluding documentation of all conducted workings for your fire safety engineer according to layout requirements
- creating of fire fighting, emergency and safety plans
- basic agreement for annual inspection and measurement according to normative requirements
Our full-service package is available to you

With us you get your personal full-service package from one source. We service your project from the very first consultation all the way to the final inspection. Yet you choose which components your project shall include. Here is an example for the extension of a warehouse building:

1. Needs assessment
   - Without on-site inspection: determination of the necessary marking products based on existing building safety plans/ maps.

2. Planning and quoting
   - Planning for the warehouse area, taking existing code and standard requirements into consideration.

3. Delivery and installation
   - Implementation and supervision of the project through final acceptance of the work performed.

4. Documentation
   - Preparation of final documentation of all work performed for your fire safety engineer.

As individual as each company is, as many individual solutions exist. We respond specifically to your requirements and develop a customized full-service package for your needs.

Therefore do the planning with Permalight®:

- all services from one source
- 25 years of know-how and experience in planning Safety Guidance Systems
- your personal Permalight project manager will accompany you through all stages of the project with his expert knowledge
- very fast response- and implementation time
- optimal solutions for individual needs

Many customers have already entrusted us with their escape route markings.

Call us today - we will be happy to assist you

+49 (0) 5101/9263-26
Product advantages at a glance

Photoluminescent Low Location Guidance Systems from Permalight®:

- reliable orientation and safety in case of power outage and smoke
- cost-efficient in purchase and assembly
- no maintenance costs
- independant from electricity
- failure-free
- maintenance-free
- non-polluting
- all-purpose
- adaptable for any kind of requirement profile and any application area

Permalight®—custom made Safety Guidance Systems from only one source!
What is a Safety Guidance System?

The generic term "optical safety guidance system" stands for different safety concepts. You distinguish between electrical and light storing safety guidance system concepts. Depending on the application field they are installed low located and not low-located (p. diagram). For all fire-risque areas, where smoke filling can not be excluded a low located safety guidance system according to ASR is regulated by law.

**Not low-located safety guidance system:**
Not low-located guidance systems are the classic marking of escape routes. Normally they consist of single signs (fire protection and rescue signs) as well as rescue lights above the emergency exits. The installation is carried out in view height or above the door. Thereby the distances between the selectively placed signs and lights are often very large.

**Low-located guidance systems:**
With this system the classic marking composed of single signs and lights is completed through a continuous marking on the wall or directly on the floor.
Escape route directions and particularly existing obstacles in the course of the escape route will be shown continously. By this the escape speed rises. Escaping persons, also without local knowledge, can sterically orientate them-selve and in case of danger seek shelter without panic.
What is a Safety Guidance System?

Why low-located assembly of the guidance lines is so important?

Not the fire but the toxic smoke is the main cause of fire deaths during building fires. If smoke penetrates into the escape route areas, a quick and clear orientation is essential for survival.

In case of a fire the plume at first accumulates in layers at the upper wall and ceiling area. Electrical emergency lights and single escape route signs are normally installed at viewing height or door height. In case of smoke they are, due to their position, no longer clearly recognizable in shortest time and get ineffective.

![Image showing smoke emission and orientation]

The smoke emission is shown clearly in this illustration: 60 seconds after the beginning of the fire „free“ viewing and air for breathing is only possible in a height of at most 40 cm.

The continuous marking stripes of the Low Location Guidance System are installed directly on the floor or to the wall below the smoke limit of 40 cm. For this reason a good orientation is still possible even in case of high smoke emission.

Safety specialists require the application of Low Location Guidance Systems primarily when materials are available which can develop a high smoke emission in case of fire.

For all fire-risque areas, where smoke filling can not be excluded the legislator asks for the application of a low located safety guidance system according to the new guideline for work places (ASR A3.4).
What is a Safety Guidance System?

Light-storing or electrical?

Light-storing or photoluminescent systems have clear advantages in opposite to electrical systems.

A safety excess!

In case of fires total power failures are frequent. Thus current-dependent rescue guidance systems and emergency lights can get ineffective. Photoluminescent markings however appear immediately in total darkness in a green-yellowish light. They glow without the need of electricity for many hours and reliably show the way to the next emergency exit. The safety information maintains also in case of power outage!

Reliability!

Photoluminescent guidance systems are the economical alternative to conventional safety lighting. In comparison to electrical or battery-powered guidance systems they are not only cheaper in purchasing but they also help to make long-term economies. They function non-polluting, failure-free, maintenance-free and do not cause any maintenance costs. Photoluminescent guidance systems do not need any power supply!

Flexible applications!

The variety of photoluminescent products and materials offers not only more but also individual possibilities of markings which electrical systems could never give.

Example:
escape routes in warehouses and production areas

In production areas with a lot of machines and equipment the marking of the escape routes is only possible on the floor. With photoluminescent markings, escape routes and escape directions will be indicated clearly without expensive electrical installations.

Does your escape route accord to the new guideline or workplaces?

With photoluminescent products you complement your existing escape route marking quickly and without technical complexity to a low-located optical safety guidance system according to ASR A3.4.
Guidance markings in the lower wall area provide areal orientation in case of sudden darkness and smoke.

Directional arrows at the wall and on the floor show the escape direction to the next emergency exit.

Stair nosings prevent the risk of stumbling. The single steps and the platforms cannot be seen in the dark.

The handrail marking provides additional safety.

The door marking makes the contour of the emergency exit door easily recognisable.

The emergency sign lamp marks the nearest emergency exit in compliance to the standards.

The door handle backing shows the door handle and the opening direction at once.

Warning markings (tapes or profiles) mark obstacles in the course of the escape route, such as columns, wall protrusions or low ceilings.

Escape route signs mark the escape direction. They should be additionally attached next to the floor, in order that they can be recognised in case of fire.

Fire protection and emergency stations are integrated in the Safety Guidance System. The signs are photoluminescent, the object (here a fire extinguisher) is marked with a photoluminescent backing or marking strips.
Guidance lines for walls

Our product range varies from the basic version of self-adhesive foil for areas such as productions, warehouses, logistics etc. up to the top version of aluminium profile systems for all areas where an attractive optic is requested, e.g. hotels, airports, administrative buildings, etc.

The correct marking of walls:
The ASR A3.4 dictate a minimum width of 50 mm for the guidance strips.
The top edge of the marking is installed at approx. 40 cm above the floor level.
If the escape route is more than 3,60 m wide a marking on both wall sides is needed.

Self-adhesive guidance lines on roll
- available unprinted and printed with green arrow
Suitable for a quick and easy installation on smooth surfaces. Versatile use.

Transparent stickers with escape route signs and direction indicators
To stick on guidance lines or guidance strips for aluminium profiles. Permits a quick orientation in case of emergency.

Aluminium guidance lines
The guidance lines are available with self-adhesive backing as well as for the installation with high-quality aluminium profiles.

The shown product choice only represents a small part of our entire product range. Ask for our main catalogue or inform yourself at www.permalight.com about the complete product range of photoluminescent safety products!
Products to choose from

Floor markings

We deliver the product especially adjusted on your requirements. Whether for the use in chemically heavy loaded areas, in industry atmosphers or localities with extreme mechanical load - we stock the suitable floor marking for every subsoil and application area.

The correct marking of floors:
Floor markings must have a minimum diameter or a side length of 50 mm. Single markings like dots and signs for floors are considered as continuous line if you place minimum 3 signs per meter.

Photoluminescent anti-slip tape roll
The quick and easy solution for smooth surfaces. Self-adhesive, avoids slip hazards. Applicable everywhere: warehouses, production areas or administration buildings.

Escape route signs for floors
The quick and easy solution for smooth surfaces. Self-adhesive, avoids slip hazards. Applicable everywhere: warehouses, production areas or administration buildings.

Casting resin and paint
For floor markings in areas with highest chemical and mechanical load and for difficult subsoils.
Application: continuous line or arrows (with stencil).

Anti-slip dots
self-adhesive, unprinted and printed, anti-slip surface rating R10

Enameled metal discs
For areas with high chemical and mechanical load.
Door markings

Whether representative glass doors or fire doors made of metal: our product range offers you the applicable solution for an effective marking of any kind of escape route doors and emergency exits.

The correct marking of doors:
Escape doors as a component of emergency routes and emergency exits must be equipped with a frame of at least 200 mm width. The position of the door handle and the opening direction must be clearly marked.

Door angles and door strips
The self-adhesive aluminium angles and strips are available in two different designs: plain photoluminescent or with photoluminescent arrows. Frames with photoluminescent arrows achieve higher attention.

Door backings
The door handle backing shows the position of the door handle and the opening direction quickly.

Door indication for glass doors
The eye-catching door markings show immediately in which direction the door opens. Printed on both sides for glass doors.

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## Stair markings

In our product line you find the suitable marking for every requirement and each kind of stairs: Indestructible anti-slip stair nosings made of stainless steel for production areas, dots for gratings, unobtrusive aluminium edges for the administration area and so on.

### The correct choice for stair markings:
Steps, ramps and pedestals of a stair must be marked in a way that beginning, course and end are clearly recognizable. The markings at the stair edge must be at least 10 mm wide. For a better orientation the handrail will also be marked photoluminescent.

### Anti-slip stair nosings and -edges
Self-adhesive nosings and edges made of aluminium for the marking of single steps. The marking of the first and last step of a stair nosing provides the best orientation.

### Anti-slip stainless steel stair nosings
For more safety in production areas: the fluorescent and in the same time photoluminescent design permit best orientation by day and at night and avoid unnecessary slip accidents. For the application to difficult and heavy loaded subsoils.

### Hand rail marking
Self-adhesive marking foil. Available on roll and as strips.

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Marking of obstacles and hazard areas

We deliver the adequate warning marking product for each application: from self-adhesive film strips over aluminium strips, marking paints to bumper guards in photoluminescent quality. For the marking of machines, vehicles, inventory.

The correct marking:
Corners, edges, protrusions in the course of the escape routes have to be marked with photoluminescent marking strips or bumper profiles. Guidance lines have to show/lead around obstacles. In production and storage areas particularly machines, vehicles, inventory and so on should be clearly recognizable in case of emergency.

Daylight-fluorescent/photoluminescent warning markings

Highest warning effect - by day and at night. For the marking of wall projections, pillars, ceilings and so on, made of self-adhesive vinyl.

Warning marking strips and angles
Made of aluminium, applicable everywhere, well suited for difficult surfaces like rough masonry, exposed aggregate concrete, wood and so on.

Bumper guards
Bumper guards prevent effectively from injuries caused by protruding corners, edges and obstacles.
Self-adhesive, for screwing and for slipping on

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Products to choose from

Fire protection

In the course of the escape route safety-related and fire protection-related equipments should be absolutely included into the photoluminescent marking.

Fire extinguisher backing

Photoluminescent backings provide high attention.

Fire extinguisher marking strips

Mark your fire extinguisher photoluminescent.

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Products to choose from

Escape route signs and fire protection signs

Our product range contains all current pictograms of escape route markings and fire protection markings according to DIN 4844, DIN 67510, ISO 6309 and ISO 7010 as well as international emergency signs, practice approved signs and much more. In addition we produce individual signs with international pictograms according to the corresponding normative specifications on demand.

The right choice of sign dimensions has a great influence on their efficacy. The dimensions go conform with the requested viewing distances (see diagram on page 18).

When choosing the signs, the application area should be taken into consideration. The form of the sign is essential for the light (see diagram on page 19).

The most important signs in the course of the escape route

<table>
<thead>
<tr>
<th>Escape route signs</th>
<th>Fire protection signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>available as combined signs and single signs</td>
<td>available as combined signs and single signs</td>
</tr>
</tbody>
</table>

- Emergency phone
- First Aid
- EXIT escape route sign for international use

Fire protection signs
German Standard (DIN 4844)

Fire protection signs
International standard (ISO 7010)

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Design basics for signs

Viewing distances

Which dimensions should a sign have?

The dimensions of the sign and the distance between the viewer and the sign are essential for a good recognizability of the sign.

The below-mentioned diagram shows the maximum viewing distance up to which standardised signs are recognizable.

![Diagram showing maximum viewing distances for standardised signs](image)

These specifications are reference values. If you are insecure about the right size, we recommend the usage of the next larger sign in terms of safety.

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Internet: www.permalight.com - E-Mail: verkauf@permalight.com
Escape route signs and fire protection signs

When using signs the shape also contributes to an optimal perception. Due to the employment of different sign shapes the safety statement can be intensified.

**Flat Signs**

With a light dispersion of 90 degrees flat signs offer a good visibility in the course of a photoluminescent guidance system and are especially suitable for frontal markings.

**L-shaped signs**

L-shaped signs are optimally suitable for long corridors. The safety statement is recognizable in an angle of 90 degrees from both sides. L-shaped signs extend into the room and thus are better and earlier visible.

**V-shaped signs**

The form of V-shaped signs still reaches a higher attention level: The light dispersion at darkness is recognizable in a radius of a total 180 degrees. The application of V-shaped signs is recommended primarily for big rooms and halls.

**Ceiling-mounted signs (printed double-sided)**

Ceiling-mounted signs also provide the safety statement on both sides with a spreading of 180 degrees. They find their application primarily in lobbies and high stairways.

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Permalight® safety markings

are available on different carrier materials.
When choosing the material it needs to be checked which kind of environmental effects are exis-
tant, for example:

- mechanical load
- chemical factors
- atmospheric conditions
- wet environments
- ultraviolet rays
- heat

The subsoil on which the sign will be installed also needs to be taken into consideration for the material choise.

**Photoluminescent vinyl**

- laminated with high performance adhesive
- ageing resistant with long lasting luminance
- easy to handle

For the application on smooth, clean, greaseless subsoils, for example self-adhesive marking tape for doors in office and administration areas.

**Photoluminescent polycarbonate**

- excellent adhesive properties
- high impact-strength
- high scratch-resistance
- temperature stable from -40°C up to +130°C

In particular for floor markings on smooth subsoils, e.g. in warehouses and production areas with little chemical load.

**Permalight® rigid PVC**

- to screw on or to glue with assembly glue
- high resilience and good stability
- very temperature and weather resistant
- long durability

Good processing properties, also suitable for rough subsoils; for interiors.
Materials to choose from

**Permalight® - acryl**

- cristal clear and light-resistant
- shock-proof and shatterproof
- including high-quality mounting parts

For indoor- and outdoor areas. Due to the attractive design these acrylic safety markings are well suited for prestigious areas.

**Permalight® - aluminum**

- to screw on or to glue on
- especially durable
- insensitive against heat and mechanical load
- weather resistant
- high tensile strength and little weight

For everlasting application in interior zones e.g. administration areas, production halls and warehouses. The luminances Permalight® power and Permalight® spezial are also suitable for outdoor use.

**Permalight® - stainless steel**

- extremely durable
- resistant against oils, greases and chemical load
- acid-resistant

Suitable for indoor use, application in production areas and food stuff areas. The luminances Permalight® power and Permalight® spezial are also suitable for outdoor use.

**Permalight® - photoluminescent epoxy and polyurethane paint systems and casting resin**

- resistant against diluted acids, bases, commercial cleaners, vapor stream cleaner, fuel, oils, greases and a lot of chemicals
- high temperature-resistance
- processing of paint systems: spraying, coating, rolling
- processing of casting resin: applying with stencil and scraper

For the marking of floors with high chemical and mechanical load. Especially recommended in case of high pedestrian, vehicle and forklift traffic like in subway stations, rooftop parkings, warehouses and production areas.
The right luminance

Generally the particular illuminating situation (continuity, quality and intensity) on location decide about the effectuated luminance of the products. In addition the design of the guidance system has to be in accordance with existing standards and legal specifications.

<table>
<thead>
<tr>
<th>Permalight® standard</th>
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</thead>
<tbody>
<tr>
<td>For very well illuminated rooms with intensive continuous lighting or daylight, for example office rooms with windows.</td>
</tr>
<tr>
<td><strong>Quality properties of Permalight® standard:</strong></td>
</tr>
<tr>
<td>● Luminance: 20 mcd/sqm after 10 minutes and 3 mcd/sqm after 60 minutes. (Measurement according to DIN 67510, part1)</td>
</tr>
<tr>
<td>● Decay time approx. 6 hours</td>
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<tr>
<th>Permalight® plus</th>
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<tr>
<td>For all workspaces with bright continuous light during operation time.</td>
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<tr>
<td><strong>Quality properties of Permalight® plus:</strong></td>
</tr>
<tr>
<td>● Luminance: 55 mcd/sqm after 10 minutes and 8 mcd/sqm after 60 minutes. (Measurement according to DIN 67510, part1)</td>
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<tr>
<td>● Decay time approx. 16 hours</td>
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<table>
<thead>
<tr>
<th>Permalight® power</th>
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<tr>
<td>For the installation of a Safety Guidance System the Permalight® power system has stand the test. For areas with damped or only occasional light or in combination with a safety lamp, for example: hospitals, nursing homes, big hotels, event locations, shopping malls, airports, power plants, production areas and warehouses, gangways, furnace rooms and so on.</td>
</tr>
<tr>
<td><strong>Quality properties of Permalight® power:</strong></td>
</tr>
<tr>
<td>● Luminance: 150 mcd/sqm after 10 minutes and 22 mcd/sqm after 60 minutes. (Measurement according to DIN 67510, part1)</td>
</tr>
<tr>
<td>● Decay time approx. 35 hours</td>
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</tbody>
</table>
Permalight® spezial

Individual solutions for all light situations.

For special surroundings with very low lighting or only very short excitation intervals such as underground crossings, underground installations, basement garages, furnace rooms, subway, and so on it requires an individual solution with the use of pigments with extremely high luminance, also in case of short light influence.

After measurement and analysis of the existing light situation we develop your individual custom-made safety products.

Quality properties of Permalight® spezial:

- Luminance: variable up to 900 mcd/sqm (Measurement according to DIN 67510, part1)
- Decay time variable up to 180 hours
- Depending on the requirements a fast charging version is possible

Permalight® speed

Permalight® speed was developed especially for applications in tunnels. These products are already activated with the lowest surrounding light and with very short light intervals, for example by passing trains or cars. With their intensive luminance they offer excellent results particularly in the first minutes.

Quality properties of Permalight® speed:

- Luminance: up to 400 mcd/sqm (Measurement according to DIN 67510, part1)
- Decay time depends on design
How do photoluminescent products work?

Light-storing pigments are the secret of photoluminescent products.

**The photoluminescent effect arises due to the charging of the product by a light source.**

The pigments in the material absorb the light which will be emitted over a long period of time. The three following points are important for the grade of luminance of the pigments:
- intensity of light at the place of application (measured in lux)
- kind of illumination (colour temperature of light measured in Kelvin)
- time of charging / illumination (in minutes)

The intensity of the maximum luminance decreases continuously in the same time as the human eye adapts to the darkness. Therefore the orientation guides are still efficient after several hours.

The pigments can be reactivated endlessly provided there is no mechanical or chemical damage. Therefore the products are absolutely maintenance-free and do not cause any servicing costs.

**Further pigment properties:**
- non-toxic
- not radioactive
- lead-free
- low flammability
- free of phosphor

**Individual solutions are our strength!**

The assignment of the pigment variety rare earth enable luminances up to 900 mcd/sqm and decay times up to 180 hours (measurement according to DIN 67510, part 1).

For all areas with extremely low lighting or short excitation intervals we produce for you custom-made photoluminescent products with individual luminances.
Permalight products fulfill the national and international quality requirements.

**Requirements and recommendations:**

**national:**
- DIN 4844 (Germany)
- DIN 67510 (Germany)
- BGV A 8 (Germany)
- BGR 131 (Germany)
- BGR 216 (Germany)
- ASR A1.3 (Germany)
- ASR A2.3 (Germany)
- ASR A3.4 (Germany)

**international:**
- UNE 23035/1-4 (Spain)
- Ö-Norm (Austria)
- AFNOR (France)
- ASTM (USA)
- IBC (USA)
- MEA NY (New York City)

ISO 3864
ISO 6309
ISO 15370
ISO 16069
ISO 7010

and much more

Naturally we manufacture individual signs with international pictograms according to the corresponding normative specifications on demand.
Extract of our reference list

Customers who trust in "Photoluminescent Safety Guidance Systems" from Permalight®

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<td>• Mannesmann Röhrenwerke</td>
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<td>• Uniklinikum Göttingen</td>
<td>• Deutsche Bahn AG</td>
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<td>• Klinikum Essen</td>
<td>• NY Stock Exchange</td>
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<td>• Bayer Leverkusen</td>
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<td></td>
<td>• Medizinische Hochschule Hannover</td>
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<td>• Klinikum links der Weser, Bremen</td>
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<td>• Hotel Intercontinental</td>
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<td>• Vattenfall</td>
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<td>• World Trade Center, NYC</td>
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<td>• Hotel Concord, Donaueschingen</td>
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<td>• Hotel Oberkassel, Düsseldorf</td>
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<td>• Bayer Leverkusen</td>
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<td>• Coffein Compagnie, Bremen</td>
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<td>• Ohrenstein &amp; Kappel, Dortmund</td>
<td>• Wessels und Müller</td>
</tr>
<tr>
<td>• Voestalpine</td>
<td>• Evonik Degussa</td>
</tr>
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</table>

and much more
Impressum

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